

9a. Grading Option: Standard Grade

9b. Catalog Description:

Applications of mathematics in economics and business contexts. Topics include tables and graphs, functions, finance (interest and exponential models), rates of change including applications and optimization, and linear programming.

Course Outline Information

10. Student Performance Objectives: (Performance objectives for all credit courses must indicate that students will learn critical thinking and will be able to apply concepts at college level. Performance objectives must be related to items listed in Section 11.)

Upon completion of this course, the student will be able to:

1. Analyze formulas, tables, and graphs;
2. Identify and graph linear, quadratic, power, polynomial, exponential, logarithmic and composition functions;
3. Calculate compound interest, present and future values;
4. Apply exponential models in economics;
5. Evaluate rates of change (derivatives) for a variety of elementary functions and apply to marginal analysis;
6. Measure the sensitivity of demand;
7. Find and interpret optimum values related to business applications;
8. Solve linear programming problems by a graphical approach.

11. Course Content Outline: (Provides a comprehensive, sequential outline of the course content, including all major subject matter and the specific body of knowledge covered.)

Functions: (Examples include cost, revenue, and profit functions, depreciation functions, budget constraints)

1. Formulas, tables, and graphs
 - a. Discrete and continuous
 - b. Increasing and decreasing
2. Proportionality and linear functions
3. Quadratic functions, power functions, and polynomials
4. Exponential and logarithmic functions
5. Combining functions
 - a. Sums and differences
 - b. Products
 - c. Composition of functions

Finance:

1. Compound interest
 - a. Finite geometric series
 - b. Exponential functions and limits (continuous compounding)
2. Present and future value
3. Exponential models in economics
 - a. Polynomial growth
 - b. Exponential growth
4. Compound Interest Formulas - dependence on P, r, and t

Rates of Change:

1. Average rate of change
2. Marginal cost from a discrete point of view
3. Evaluating rates of change for a variety of elementary functions
 - a. Graphical interpretation and evaluation
 - b. Numerical evaluation
 - c. Algebraic evaluation
 - d. Utilize limits and definition of derivative
4. Rates of change for more complicated functions
 - a. Sums and differences
 - b. Products and quotients
 - c. Power Rule
 - d. Exponential and logarithmic functions
5. Applications
 - a. Marginal analysis
 - b. Elasticity of demand
6. Optimization
 - a. Extreme points and points of inflection
 - b. Profit maximization
 - c. Cost minimization (inventory)
 - d. Revenue maximization
 - e. Break even

Linear Programming

1. Examples of Linear Programming problems (product mix, allocation)
2. Necessity of Linear Programming
3. Geometrical or graphical solution of Linear Programming problems
 - a. Graphic linear equations and inequalities
 - b. Graphing the region of feasibility
- c. Finding corner points and solving the Linear Programming problem

12. Typical Out-of-Class Assignments: (Credit courses **require** two hours of independent work outside of class for each lecture hour, less lab/activity classes. List type of assignments including library assignments.)

a. Reading Assignments: (Submit at least 2 examples.)

1. Read the applied examples on amortization and sinking funds and write a summary of what you have learned.
2. Go online and read about the Credit Card Act of 2009.

b. Writing, Problem Solving or Performance: (Submit at least 2 examples)

1. After reading about the Credit Card Act of 2009, create a list of the 5 major changes that you found to be most beneficial to consumers.
2. Solve applied mathematical problems in economics that use exponential models. Example: Assume that on the day you were born, your grandmother put \$5000 into an account that grew at a rate of 4.5% compounded continuously. How much money would you have in the account on your 18th birthday?

c. Other (Term projects, research papers, portfolios, etc.)

13. Required Materials:

a. All textbooks, resources and other materials used in this course are college level?

- Yes
 No

b. Representative college-level textbooks (for degree applicable courses) or other print materials:

Book 1:

Author: Tan
Title: Applied Mathematics for the Managerial, Life, and Social Sciences
Publisher: Brooks/Cole
Date of Publication: 2010
Edition: 5

c. Other materials and/or supplies required of students:

Scientific Calculator

14. Check all instructional methods used to present course content:

- | | |
|---|---|
| <input checked="" type="checkbox"/> Lecture | <input type="checkbox"/> Activity |
| <input type="checkbox"/> Discussion Seminar | <input checked="" type="checkbox"/> Distance Education (requires supplemental form) |
| <input type="checkbox"/> Lab | <input type="checkbox"/> Work Experience |
| <input type="checkbox"/> Directed Study | <input type="checkbox"/> Tutoring |

Other:

Give detailed examples of teaching methodology that relate to the course performance objectives:

Example 1: Interactive lecture format to develop the concept of what a function is, and analyze the properties of the different types of functions (linear, quadratic, power, polynomial, exponential, and logarithmic). To help students see the commonalities and differences between each type of function, instructor will incorporate algebraic analysis through equations, visual analysis through graphing, and numerical analysis through evaluation. Students will participate verbally and by working various examples.

Example 2: In class small group collaborative learning activity focusing on applied business math problems involving economic models, interest, marginal cost. Students will practice reading problems, interpreting the problems, and developing solution with peers.

Example 3: In class or online discussion of problems worked by students independently (such as homework problems). For example, students and teacher will discuss methods to evaluate rates of change (derivatives) for a variety of elementary functions, and apply to marginal analysis.

15. Methods of Assessing Student Learning

15a. Methods of Evaluation:

- | | |
|--|--|
| <input type="checkbox"/> Essay Exam | <input type="checkbox"/> Reports |
| <input type="checkbox"/> Objective Exam | <input checked="" type="checkbox"/> Problem Solving Exam |
| <input checked="" type="checkbox"/> Projects | <input checked="" type="checkbox"/> Skill Demonstration |
| <input checked="" type="checkbox"/> Class Discussion | <input type="checkbox"/> Other |

15b. (All courses must provide for measurement of student performance in terms of stated student performance objectives, Area 10, and culminate in a formal recorded grade based on uniform standards. Submit at least 2 examples.)

Example 1: Calculate the derivative of a rational function using the quotient rule. This problem is graded based on the completeness and correctness of the quotient rule, the algebra used in simplifying, and of the derivative found.

Example 2: Analyze the meaning of the derivative of a profit function. This question is graded based on the correctness of the derivative found, and a clear, concise and correct analysis.

Example 3: Take home project involving research of current interest rates and calculating the amount of time it will take to save up for a major purchase using compound interest formulas. Satisfactory performance measured if students find current data on interest rates and pricing, correctly calculate the results, and communicate their solution mathematically and in writing.

SECTION C

1. Program Information:

- In an approved program
- Part of a new program
- Not part of an approved program

2. TOP Code Information

Program Title: Mathematics, General 170100

3. Course SAM Code:

- A - Apprenticeship Course
- B - Advanced Occupational
- C - Clearly Occupational
- D - Possibly Occupational
- E - Non-Occupational

4. Faculty Minimum Qualifications/Degrees:

Mathematics

Comments:

SECTION D**General Education Information:****1. College Associate Degree GE Applicability:**

Math Competency

2. CSU GE Applicability: Analytic Thinking

B-4 Mathematics/Quantitative Reasoning

3. IGETC Applicability:**4. CAN :****5. LDTP:****SECTION E****1. Articulation Information: (Required for Transferable Courses Only)**

- CSU Transferable
- UC Transferable
- CSU/UC Major Requirement.

If CSU/UC major requirement, list campus and major. (Note: Must be lower division)

CSUS Business Major

2. List at least one community college and its comparable course. If requesting CSU and/or UC transferability also list a CSU/UC campus and comparable lower division course

Folsom Lake College: Math 343 Modern Business Mathematics
American River College: Math 342 Modern Business Mathematics
CSU Sacramento: Math 24 Modern Business Mathematics

SECTION F

Planning and Resources: Please address the areas below:

1. Evidence of Need or Potential: recommendations of advisory committee, connection to existing or planned degrees/certificates, or regional/national developments, transfer university requirements.

Required for business majors transferring to CSUS.

2. Appropriateness to Mission: connection to basic skills, transfer, career technical education, or lifelong learning; relationship

Transfer-level math class.

3. Place in Program/Department: relationship to student learning outcomes identified by program, connection to general education, or articulation with other institutions.

Meets GE applicability for Math Competency and Communication and Analytical Thinking. Course includes all four Math program SLO's (Equations and Expressions, Visual Models, Applied Problems, Communication).

4. Availability of Faculty and Facilities: minimum qualifications to teach course, special training for instructors, or long-term physical impact of course.

All math faculty members meet the minimum qualifications to teach this course. No special training would be required.

5. Potential Impact on Resources: impact on library, computer support, transportation, equipment, or other needs

Classroom space, FTEs.

SECTION G

1. Maximum Class Size (recommended): 35

2. If recommended class size is not standard, then provide rationale: